Physician, Practice, and Patient Characteristics Related to Primary Care Physician Physical and Mental Health: Results from the Physician Worklife Study

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Objective. To study the impact that physician, practice, and patient characteristics have on physician stress, satisfaction, mental, and physical health.
Data Sources. Based on a survey of over 5,000 physicians nationwide. Four waves of surveys resulted in 2,325 complete responses. Elimination of ineligibles yielded a 52 percent response rate; 1,411 responses from primary care physicians were used.
Study Design. A conceptual model was tested by structural equation modeling. Physician job satisfaction and stress mediated the relationship between physician, practice, and patient characteristics as independent variables and physician physical and mental health as dependent variables.
Principle Findings. The conceptual model was generally supported. Practice and, to a lesser extent, physician characteristics influenced job satisfaction, whereas only practice characteristics influenced job stress. Patient characteristics exerted little influence. Job stress powerfully influenced job satisfaction and physical and mental health among physicians.
Conclusions. These findings support the notion that workplace conditions are a major determinant of physician well-being. Poor practice conditions can result in poor outcomes, which can erode quality of care and prove costly to the physician and health care organization. Fortunately, these conditions are manageable. Organizational settings that are both "physician friendly" and "family friendly" seem to result in greater well-being. These findings are particularly important as physicians are more tightly integrated into the health care system that may be less clearly under their exclusive control.

Key Words. Primary care physicians, job satisfaction, job stress, mental health, physical health

Twenty years ago it would have been unusual to have a session on physician job satisfaction at a conference on health care research. Everyone knew that doctors had good jobs, even if they were difficult and challenging. The recent past has seen numerous and well-documented changes (Scott 1993). Financial, technological, and delivery system changes have been important, but more directly affecting physician job satisfaction and stress levels are changes in the actual organization of the medical workplace. Many observers have suggested that the autonomy of physicians is being constrained (Navarro 1988), as purchasers, employers (McKinlay and Stoeckle 1988), and consumers (Haug 1988) exercise countervailing power (Light 1993).

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The reactions to these changes have been documented in various sources. Newspapers chronicle the woes of a medical career (Hall 1995), linking surging disability claims to job dissatisfaction (Hilzenrath 1998). Similarly, research journals have linked poor physician satisfaction to higher rates of patient noncompliance (DiMatteo, Sherbourne, Hays, et al. 1993) and patient dissatisfaction (Linn et al. 1985) and go further to suggest that dissatisfied physicians may have riskier prescribing profiles (Melville 1980). Associated with this decrease in satisfaction is a corresponding increase in perceived levels of stress, which may lead to such outcomes as burnout, mental health problems, or even suicide (Arnetz, Horte, Hedberg, et al. 1987). More ominous is the linkage of stress with disruption of work performance, including absenteeism, turnover, decline in job performance, accidents and errors, and alcohol and drug use (Kahn and Byosiere 1992). Taken together, these findings suggest that distress and dissatisfaction have significant costs not only to the individual physician, but also to the patient and health care organization. This is even more important as increasing numbers of physicians practice in organized settings.

In looking for insight on how to address these issues, we must draw on the physician job satisfaction and job stress literature. However, the literature is subject to two limitations. The first is that they are chiefly devoted to description and prescription. Many recommendations are made, often based on common sense or intuition, which are not supported by empirical findings. The second limitation lies in the observation that most of the empirical work has focused on the causes of job satisfaction and job stress rather than examining their impact on physicians, patients, and health care organizations. Our purpose in this study is to begin to redress some of these limitations and to provide "good science" upon which recommendations can be made to physicians, managers, and policy makers. The following section features a conceptual model of physician satisfaction and stress that explores both their causes as well as their consequences.

Conceptual Model

Theoretical Basis

Our model (Figure 1) draws on the theoretical models presented by Lazarus and Folkman (1984) and Ivancevich and Matteson (1980). The

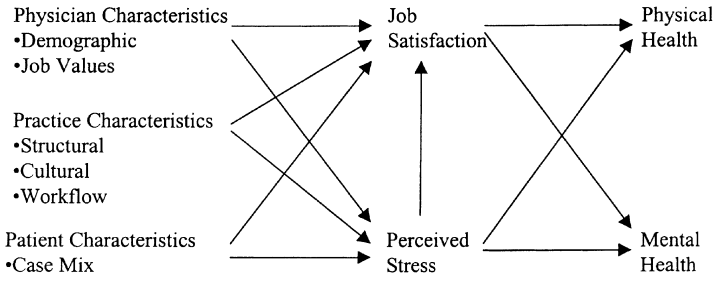
strength of the Lazarus model lies in the specification of the cognitive processing that attends stressful events. Specifically, stress is defined as a troubled relationship between the person and environment in which environmental demands tax or exceed a person's resources. The cognitive processing that attends the stressful experiences tries to address questions such as "Am I in trouble?" and "What can I do about this situation?" Subsequent to processing, Lazarus theorizes that some immediate effects like physiological (hormonal or blood pressure changes) or emotional (positive or negative feelings) reactions occur. In the longer term, chronic stress can lead to somatic complaints or illness, lower morale, and impaired social functioning. Ivancevich and Matteson's model features four stages: antecedents (stressors), stress, outcomes, and consequences. Both intra-organizational and extraorganizational factors are considered as antecedents. Furthermore, intraorganizational antecedents are offered at the individual, group, and organizational levels. These antecedents produce job, career, or life stress, which results in several outcomes, including physiological (serum cholesterol and blood pressure), behavioral (satisfaction, performance, absenteeism, and turnover), and, in the longer term, diseases of adaptation (coronary heart disease, anxiety, and depression). The outcomes and consequences of Ivancevich and Matteson map cleanly on the immediate and long-term effects of Lazarus.

Conceptual Model Elements

Our conceptual model (Figure 1) draws specifically on Ivancevich and Matteson by specifying three specific sets of characteristics (physician, practice, and patient) that may act as stressors. Drawing on Lazarus, we theorize that these stressors are subject to some cognitive processing, which results in an appraisal of stress we term perceived stress. Additionally, both of these antecedents and stress affect physician job satisfaction, and together, perceived stress and job satisfaction influence physician perceptions of physical and mental health. Job satisfaction here is the immediate effect of Lazarus or the outcome of Ivancevich and Matteson, and mental and physical health are the longer term effects of Lazarus or the consequences of Ivancevich and Matteson. The remainder of this section will detail three sets of characteristics that are theorized to effect both stress and satisfaction.

Physician Characteristics. The physician characteristics include age, income, exposure to managed care, and four job values. Research on age

Figure 1: Physician, Practice, and Patient Characteristics Related to a Primary Care Physicians' Job Satisfaction, Perceived Stress, and Physical and Mental Health



Physician Characteristics
Demographic
- Age
- Net 1995 Income
- Exposure to Managed Care

Job Values
- Long-term Patient Relationships
- Control Time Off
- Spared Administrative Work
- Clinical Autonomy

Practice Characteristics
Structure
- Practice Size
- Percent Managed Care Patients
- Percent Individual Compensation
- Control–Workplace Issues
- Control–Clinical Issues
- Control–Administrative Issues

Culture
- Emphasis on Productivity
- Emphasis on Quality of Care
- Support Work/Family Balance

Workflow
- Hours Per Week
- Perceived Time Pressure

Patient Characteristics
Case Mix
- Percent with Numerous Medical Problems
- Percent with Numerous Psychosocial Problems

Note: Correlations among exogenous (physician, patient, and patient characteristics) variables and endogenous (job satisfaction, perceived stress, physical and mental health) variables have been omitted for clarity as have the error variance of all variables.

has shown age differences in both job satisfaction (Richardsen and Burke 1991) and job stress (Simpson and Grant 1991). Similarly, income has been linked with job satisfaction (Grumbach, Osmond, Vranizan, et al. 1998) but not with job stress for physicians. The inclusion of exposure to managed care is based on the belief that physicians exposed to managed care during their training will be better able to cope with managed care pressures and be less likely to experience dissatisfaction or stress. Including job values recognizes the role they play in the cognitive process for assessing fit between the person and the job (Edwards 1992) where poor fits may result in higher levels of stress and lower levels of satisfaction.

Practice Characteristics. These characteristics are divided into structural, cultural, and workflow elements. The structural variables represented in our model are practice size, the percentage of managed care patients in the practice, percentage of income because of individual productivity, and amount of control over workplace, clinical, and administrative issues exerted by physicians. Differences in practice size have been found to effect satisfaction (Warren, Weitz, and Kulis 1998) and stress (Lewis, Barnhart, Howard, et al. 1993). The inclusion of the percentage of managed care patients in the practice represents the varied demands managed care can make on physicians and their practice organizations. It is argued that physicians with more managed care patients are more likely to experience lower job satisfaction and higher levels of stress because of the larger administrative burden and "hassle factor," which frequently accompanies managed care contracting. The percentage of income caused by individual productivity variable captures the notion that pay may be based completely on individual effort, such as in solo practice, or that pay is not determined at all by individual efforts, as with a salaried physician (with no other incentives). It is hypothesized that when income is substantially based on individual productivity, the individual feels greater pressure to perform and consequently may be more susceptible to higher levels of job dissatisfaction or job stress. The inclusion of the three control variables is based on the premise that physicians, socialized as leaders of the health care team, will desire control over their work environment as they move into organized settings. When the desired level of control is not met, dissatisfaction and distress may result.

The cultural elements of the conceptual model draw on the pervasive influence culture has in shaping organizational behavior and attitudes (Schein 1992). In this model, we postulate that the degree of emphasis on productivity and quality of care, and the degree of support for balancing work and family will be associated with satisfaction and stress. For example, the emphasis on physician productivity may promote an environment in which physicians who perceive their productivity as deviating from their colleagues may be subject to social sanctions, which may produce lower satisfaction and higher stress levels. Likewise, a physician in an environment supporting a balance of work and family life may experience less stress and greater satisfaction because of the reduction of potential conflict between these two roles.

The third set of practice characteristics describes practice workflow and is represented by hours worked per week and the perception of being

under time pressure when seeing patients. Working longer hours has been associated with greater dissatisfaction (Mainous, Ramsbottom-Lucier, and Rich 1994) and stress (Myerson 1993). Perceptions of time pressure turns on the clinician's belief about whether they have adequate time to deliver quality medical care. The experience of time pressure may translate into higher levels of dissatisfaction and more perceived stress for those with perceptions of not having enough time with their patients.

Patient Characteristics. The patient characteristics are composed of the two case mix variables: percentage of patients with numerous medical problems and percentage of patients with numerous psychosocial problems. The reasoning underlying the inclusion of these two variables is that having a greater proportion of these types of cases, while being an intellectual challenge, may also produce additional strain on the physician, which may ultimately result in higher levels of dissatisfaction and stress.

Job Satisfaction and Job Stress. These variables are conceptualized as mediating the relationships between the three characteristics and the outcomes of physical and mental health. However, within their mediating role, job stress is conceptualized as a causal antecedent of job satisfaction. This conceptualization comes from the current job stress literature (Kahn and Byosiere 1992). In fact, Edwards (1992) cites the investigation of these relationships as an untapped opportunity "for integrating these (the job satisfaction and job stress) literatures."

Physical and Mental Health. Physical and mental health are conceptualized as two reactions to job satisfaction and job stress in this conceptual model. This is consonant with Edwards (1992) cybernetic theory of occupational stress, which hypothesizes a connection between stress and well-being (defined as psychological and physical health). Support for this conception can be found in the physician satisfaction and stress literature. Aasland, Olff, Falkum, et al. (1997) found that among Norwegian physicians, high levels of stress and low levels of satisfaction were associated with more frequent health complaints. Sutherland and Cooper (1992), taking advantage of a controversial new labor contract between the English National Health Service and its physicians, examined satisfaction, stress, anxiety, and depression before and after contract implementation. As they hypothesized, physicians subject to the new contract reported less satisfaction and more stress, anxiety, and depression.

METHODS

Sample

A national probability sample was constructed using the American Medical Association's masterfile as a sampling frame. Our target population consisted of more than 171,000 clinically active civilian M.D.s working primarily in patient care in office or hospital settings as family physicians, generalist internists, subspecialist internists, generalist pediatricians, or subspecialist pediatricians. This sampling frame excluded all surgeons, those who had not identified a clinical specialty or who called themselves general practitioners, and other nongeneralists (e.g., radiologists, pathologists, anesthesiologists). Diversity in demographic and work setting characteristics was assured by stratifying according to the physician specialty groups identified previously here, two physician race/ethnicity categories, and two levels of potential participation in managed care. The latter was estimated by the proportion of physicians in a state with managed care contracts, split into two strata, that is, upper quartile versus all others. Applying disproportionate sampling fractions to the 20 resulting strata allowed us to maximize the precision of estimates for each stratum while permitting national estimates to be constructed. From this frame, a sample of 5,704 was drawn.

Four mailings, accompanied by individually addressed cover letters from the investigators and medical society officials, resulted in 2,325 usable responses, for an adjusted response rate of 52 percent (CASRO 1982). Because primary care physicians were the focus of this investigation, we removed the 782 responses from physicians defined as medical specialists. We removed a further 132 physicians who saw patients for less than 25 hours per week. This reduced the sample size to 1,411.

To address nonresponse bias, after the fourth mailing, 10 nonrespondents selected randomly from each stratum ($n = 200$) were telephoned to determine whether we had their correct addresses. This analysis suggested an 18 percent noncontact rate. Furthermore, we searched for trends between survey variables and the time until the survey was returned, calculating Spearman correlation coefficients. Of 140 items, only 4 had coefficients of greater than 0.10 in absolute value, suggesting only a modest impact of late (or non) response.

MEASURES

Physician Characteristics. Measures of age, 1995 income, and percentage of compensation because of individual efforts, were self-reported. The exposure to managed care measure (three items; $\alpha = 0.73$) is a composite of responses to a question that asked respondents to rate their exposure to various aspects of contemporary medical practice (e.g., managed care, utilization review, and practice management). The four job value measures came out of a question asking respondents about the importance of different aspects of their job (e.g., long-term patient relationships, control time off).

Practice Characteristics. The practice-size measure was used in a previous study (Konrad, Kory, Madison, et al. 1989) to classify physicians as practicing in solo, small-group (2 to 9 physicians) or large-group (10 or more) practices. The percentage of managed care patient measure is self-report. The three control measures emerged from a factor analysis of 12 questions asking about the extent to which the respondents had control (e.g., selecting referral physicians, determining length of stay) over various aspects of work. The three factors emerging from this analysis reflected control over workplace issues (five items, $\alpha = 0.78$), control over clinical issues (four items, $\alpha = 0.70$), and control over administrative issues (three items, $\alpha = 0.63$). The two emphasis measures were single-item responses to a question about the emphasis their practice places on productivity or quality of care. The work balance question was worded, "My colleagues support my efforts to balance family and work responsibilities." The hours of work measure was a total of the hours spent in performing four activities: seeing patients in the office, seeing patients in the hospital, doing other patient-related activities, or doing other work-related activities. The time pressure measure was created by calculating the ratio of reported time needed to deliver quality care to the time reported allotted to see patients.

Patient Characteristics. The two case-mix measures were self-reported percentage of patients seen with numerous medical or psychosocial problems.

Global Job Satisfaction and Perceived Stress. The conceptual development of the global job satisfaction measure has been previously documented (Konrad, Williams, Linzer, et al. 1999). This five-item measure manifested good reliability ($\alpha = 0.88$) and face, content, convergent, and discriminant validity (Williams, Konrad, Linzer, et al. 1999). The perceived stress measure was a four-item version of the Perceived Stress Scale

(Cohen, Kamarck, and Mermelstein 1983). Their study found a reliability of 0.72; correlations of 0.37 and 0.48, with two accepted measures of anxiety, and a correlation of 0.39 with smoking behavior. Its reliability was 0.75 in this study.

Physical and Mental Health Measures. The physical health measure was worded as follows: "In general, I would say that my health is…" The five-point response scale used poor, fair, good, very good, and excellent as anchors. The mental health measure was a composite of single item measures of anxiety, depression, and burnout ($\alpha = 0.78$). The depression measure was worded, "I felt sad or depressed much of the time in the past year," and the anxiety measure was worded, "I felt anxious or nervous much of the time in the past year." Both measures used a five-point frequency scale for responses. Our single-item burnout measure had previously been used to study group practice physicians and was found to predict intended turnover (Schmoldt, Freeborn, and Klevit 1994). A copy of these measures is available from the first author upon request.

ANALYSIS

Structural equation analysis with latent variables was used to test the model as represented in Figure 1. This procedure was selected over regression because of its ability to test models with mediating variables. Furthermore, structural equation analysis features sophisticated measurement modeling where measure reliability is taken into account in separating true from error variation in relating observed variables in the measurement model to latent variables in the structural model. LISREL 8 (Jöreskog and Sörbom 1996) was the analytical package used. Because of the nonnormality commonly associated with questionnaire data and the combination of continuous and ordinal variables present in the data set, the weighted least squares procedure was used as recommended by Jöreskog and Sörbom (1996). As required by weighted least squares, a polychoric correlation matrix (Table 1) and an asymptotic covariance matrix were calculated by PRELIS 2 for analysis with LISREL 8.

Single Indicator Approach. The single indicator approach was used in our analysis because of the availability of only single items for some of the observed variables. Following recommended procedures (Williams and Hazer 1986), the error variance of each variable was set equal to its variance multiplied by one minus the scale's reliability.

Treatment of Correlations. In modeling Figure 1, correlations between variables within and across the three exogenous variable sets were allowed. We also modeled correlations between the structural disturbance terms (error variation) for physical and mental health. This approach to handling correlations was used because of the typical moderate level of correlation between each of these variables. Thus, although we did not want to model causal relationships within these variable sets, we wanted to specify a model that would statistically control for these known relationships (Bollen 1989).

Treatment of Missing Values. Because of the large number of variables in this data set and the fact that several variables had meaningful numbers of missing values (up to 12 percent), we chose to use means to replace missing values. To ensure that this procedure did not adversely impact the analysis, we examined the correlations matrix of study variables before and after replacement and found the pattern of correlations to be substantially similar.

Assessment of Overall Model Fit. To examine model fit, the Nonnormed Fit Index (NNFI; Bentler and Bonnet 1980), the Goodness of Fit Index (GFI; Bollen 1989), the Adjusted Goodness of Fit Index (AGFI; Bollen 1989), and the Root Mean Square Error of Approximation (RMSEA; Steiger 1990) were employed. The NNFI is derived from the Tucker-Lewis Index (Tucker and Lewis 1973) and compares the theoretical model with the absolute null model. The GFI reflects the relative amount of the variances and covariances predicted by the model matrix, whereas the AGFI adjusts the GFI for the model degrees of freedom relative to the number of variables. The RMSEA is derived from the population discrepancy function and its error of approximation (conceptually similar to standard error). The RMSEA measures the model's discrepancy per degree of freedom. As RMSEA approaches zero, the fit function of the model better represents the population fit function. Finally, with respect to the NNFI, GFI, and AGFI, it should be known that the 0.90 or higher convention first suggested by Bentler and Bonnet (1980) has become the de facto standard in the field (Medsker, Williams, and Holahan 1994). Brown and Cudeck (1989) suggest that values below 0.05 for RMSEA indicate a reasonable error of approximation.

Assessment of Individual Parameters. Parameter estimates are conceptually and interpretationally similar to regression coefficients and reflect the strength of the relationship between two variables. The significance of these estimates is determined by a standard t test.

Table 1: Means, Standard Deviations, and Intercorrelations

	Mean	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Age	46.75	9.93							
Income	131,774.51	68,124.15	0.06						
Percentage of compensation due to individual efforts	59.83	41.64	0.25	0.10					
Training in managed care	1.44	0.58	−0.26	−0.03	−0.11				
Job value − long-term patient relationships	3.44	0.76	0.11	0.02	0.12	0.01			
Job value − control time off	3.72	0.54	−0.28	−0.06	−0.15	0.04	0.06		
Job value − spared administrative work	2.74	0.92	0.02	−0.04	0.08	0.02	0.14	0.21	
Job value − clinical autonomy	3.54	0.64	0.00	0.02	0.08	−0.01	0.26	0.27	0.36
Practice size	2.23	0.76	−0.27	−0.08	−0.48	0.11	−0.10	0.12	−0.12
Percentage of patients in managed care	47.74	28.40	−0.08	−0.03	−0.14	−0.01	−0.06	0.14	−0.01
Control − work place issues	2.66	0.76	0.27	0.17	0.44	−0.07	0.22	−0.14	−0.01
Control − clinical issues	3.13	0.59	0.05	0.10	0.09	0.00	0.16	−0.03	−0.07
Control − administrative issues	2.11	0.69	0.19	0.06	0.11	0.00	0.16	−0.11	−0.02
Emphasis on productivity	3.11	0.94	−0.14	−0.04	−0.10	0.05	0.00	0.12	0.08
Emphasis on quality of care	2.99	0.77	0.18	0.11	0.14	−0.01	0.10	−0.14	0.11
Support of work/ family balance	3.47	0.95	−0.04	0.03	0.00	0.01	0.05	−0.02	−0.08
Hours per week	53.84	14.34	0.00	0.21	0.12	0.08	0.10	−0.10	0.09
Perceived time pressure	0.12	0.38	−0.07	−0.08	−0.13	0.01	0.00	0.04	0.07
Percent of patients with numerous medical problems	28.01	24.47	−0.03	−0.01	0.00	0.05	−0.05	−0.02	0.04
Percent of patients with numerous psychosocial problems	22.18	20.60	−0.14	−0.12	−0.13	0.08	−0.06	0.10	0.02
Global job satisfaction	3.70	0.81	0.09	0.08	0.05	0.04	0.18	−0.16	−0.14
Perceived stress	2.33	0.68	−0.11	−0.05	−0.04	0.05	−0.07	0.05	0.07
Physical health	4.11	0.91	−0.13	−0.04	−0.03	0.03	0.07	0.10	−0.03
Mental health	3.76	0.74	0.14	0.01	0.06	0.00	0.12	−0.13	−0.06

Note: This is the polychoric correlation matrix used in the analysis. It is a matrix of correlations for continuous and ordinal variables. $n = 1410$; $r > 0.5$, $p < 0.05$; $r > 0.06$, $p < 0.01$; $r > 0.07$, $p < 0.001$.

RESULTS

Descriptive Statistics

Table 1 shows the means, standard deviations, and intercorrelations of study variables. Our sample averaged 46.8 years old, was 69.5 percent male, and was 65.4 percent White. Family practitioners comprised 32.7 percent of

8	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*
−0.19															
−0.05	0.20														
0.09	−0.54	−0.21													
0.05	−0.04	−0.02	0.38												
0.06	−0.19	−0.11	0.42	0.26											
0.02	0.25	0.12	−0.25	−0.13	−0.06										
0.14	−0.27	−0.09	0.26	0.03	0.24	−0.07									
−0.05	0.10	−0.03	0.19	0.17	0.07	0.02	0.09								
0.07	−0.13	−0.07	0.10	−0.01	−0.02	−0.01	0.14	−0.09							
0.05	0.13	0.04	−0.20	−0.15	−0.08	0.12	−0.09	−0.10	−0.01						
0.06	0.09	−0.14	−0.07	−0.08	−0.06	−0.01	−0.03	−0.03	0.14	0.11					
0.07	0.17	−0.06	−0.16	−0.13	−0.15	0.04	−0.11	−0.02	0.05	0.14	0.57				
−0.12	−0.02	−0.07	0.35	0.31	0.20	−0.16	0.19	0.35	−0.05	−0.20	−0.08	−0.10			
0.01	−0.01	0.00	−0.23	−0.21	−0.20	0.08	−0.10	−0.26	0.09	0.16	0.11	0.11	−0.53		
0.03	0.09	0.01	0.07	0.17	0.06	−0.03	−0.04	0.14	−0.03	−0.07	−0.05	−0.04	0.22	−0.34	
−0.04	−0.02	−0.01	0.20	0.13	0.18	−0.09	0.17	0.23	−0.02	−0.15	−0.09	−0.15	0.54	−0.65	0.28

the sample, whereas general internists were 29.4 percent, and pediatricians were 37.8 percent. In terms of practice setting, 20.5 percent were in solo practice, 36.8 percent in small groups (2 to 9 physicians), 4.6 percent in large single specialty groups (10 or more physicians), 14.5 percent in large multispecialty groups, 10.8 percent in group/staff HMO, 5.7 percent in academic group practices, and 7.1 percent in other practice situations. On average, they made $131,774 per year.

Assessment of the Conceptual Model

The overall χ^2 for our conceptual model was 68.39 with 40 degrees of freedom and a p value of 0.003. The NNFI, GFI, and AGFI were .99, 1.00, and .99, respectively, whereas RMSEA had a value of 0.022. These values for NNFI, GFI, and AGFI exceed the 0.90 criteria, whereas the RMSEA is below the 0.05 criteria, which suggests good model fit.

The top of Table 2 shows the relationships of the antecedents (physician, practice, and patient characteristics) with the mediators of job satisfaction and perceived stress. The bottom of Table 2 shows the relationships of the mediators with the outcomes of job satisfaction and physical and mental health. Turning first to the predictors of job satisfaction, we found four of the eight physician characteristics were significant. Specifically, greater valuing of long-term patient relationships and more training in managed care were associated with higher levels of job satisfaction, whereas a greater percentage of compensation due to individual efforts and greater valuing of clinical autonomy was associated with dissatisfaction. Within the practice characteristics, 7 of the 10 predictors were significantly associated with job satisfaction. Greater job satisfaction was associated with greater control over workplace and clinical issues, greater emphasis on quality of care, and more support for work/family balance. Lower job satisfaction was associated with more control over administrative issues, a greater emphasis on productivity, and more perceived time pressure. Neither patient characteristic was associated with job satisfaction.

For perceived stress, all of the drivers came from the practice characteristics, as there were no significant relationships found in either the physician or patient characteristics. Within the practice characteristics, 4 of the 10 predictors were significant. Greater stress was associated with more perceived time pressure. Lower levels of stress came from having greater levels of control over workplace and administrative issues and greater organizational support of balancing work and family life.

Turning to the outcomes of job satisfaction and job stress, we find that five of the six hypothesized relationships were significant. As expected, job stress significantly predicted job satisfaction. This confirms their relationship as specified in the job stress literature (Kahn and Byosiere 1992). In the other set of relationships, only the relationship between job satisfaction and physical health is not significant. The other three relationships are significant at the 0.01 level. Job satisfaction is

Table 2: Relationships Among Antecedents, Mediators, and Outcomes from Conceptual Model

	Mediators	
	Job Satisfaction	*Perceived Stress*
Antecedents		
Physician characteristics		
Age	−0.03	−0.04
Net 1995 income	−0.01	0.00
Percent individual compensation	−0.07*	0.01
Training − managed care	0.07**	0.02
Job value − long-term patient relationships	0.14*	−0.03
Job value − control time off	−0.11	−0.01
Job value − spared administrative work	−0.03	0.06
Job value − clinical autonomy	−0.15**	−0.03
Practice characteristics		
Practice size	0.10	−0.17
Percentage managed care patients	−0.02	−0.02
Control − workplace issues	0.25**	−0.18*
Control − clinical issues	0.08*	−0.06
Control − administrative issues	−0.06*	−0.11**
Emphasis − productivity	−0.10**	0.05
Emphasis − quality of care	0.11*	−0.03
Support of work/family balance	0.11*	−0.19**
Hours per week	−0.03	0.04
Perceived time pressure	−0.06*	0.10**
Patient characteristics		
Percent with numerous medical problems	−0.02	0.01
Percent with numerous psychosocial problems	0.04	0.04
Outcomes		
Job satisfaction	NA	−0.45**
Physical health	−0.03	−0.44**
Mental health	0.29**	−0.59**

Parameter coefficients shown here are conceptually similar to regression coefficients and can be interpreted in the same manner.
* $p < 0.05$.
** $p < 0.01$.

associated with mental health while perceived stress strongly predicts both physical and mental health. Clearly, perceived stress exerts a stronger influence on physician physical and mental health than does job satisfaction.

DISCUSSION

On the whole, our findings suggest that the characteristics of the organization in which physicians practice have substantial effect on physicians' perceptions of stress, their job satisfaction, and consequently on their physical and mental health. Physician characteristics were found to have some influence on job satisfaction, but not on job stress. The following sections will consider the implications of these findings for physicians and organizations. We also discuss the implications of some of the negative findings, consider the limitations of this work, and offer a brief conclusion.

Physicians

One of our principle findings for physicians is that those with preparation for dealing with managed care are more likely to be satisfied with their job. This should be reassuring news to those who have worked to assure their graduates have the skills and competencies to serve communities and populations more effectively, efficiently, and compassionately (COGME 1997).

A related, but somewhat troubling finding was physicians who value clinical autonomy are not as likely to be satisfied as those who express less concern with maintaining clinical autonomy. Certainly, there may be reason to be concerned if constraints on clinical autonomy—the core attribute of professionalism—erode standards of quality. However, something quite different should concern us if those who care the least about clinical autonomy are the most satisfied clinicians in the emerging medical workplace.

A more reassuring finding is that primary care physicians who value long-term relationships with patients are also more satisfied with their jobs. Purchasers and even legislatures are catching up with patients and doctors in recognizing the importance of individual doctor–patient relationships, especially in the context of an aging population with a sizable burden of chronic illness. This finding was repeatedly reinforced with responses to open-ended questions like "if it wasn't for my patients, I wouldn't be working here."

Organizations

Although our data give us some clues to identifying the organizational elements of a satisfying and stress minimizing medical workplace, we

should examine them in the context of a major shift in the locus of physician employment. Physicians are increasingly working in organized settings, and our findings suggest this transformation is both empirical and normative. This is evident in the terminology young physicians use to describe what they do immediately after they finish their clinical training. Young physicians no longer talk about seeking to "establish a practice." They try to "get a job."

It is in this context we consider one aspect of the medical workplace: compensation. Our findings show that the more physicians are compensated on individual productivity, the less satisfied they are. This finding makes sense given that productivity-based compensation exposes physicians to market risks. Such a system was fine when physicians were mostly independent professions in solo or small group practices who kept what they earned. However, in the context of employee status, such a system seems to be perceived as engendering much downside risk without much upside gain. Furthermore, estimating and managing the risk is complicated by the use of withholds and bonuses. Thus, it is not difficult to see the effects of such a system on job satisfaction.

The second aspect of the medical workplace involves an element of time. We found that self-reported workload in hours per week was unrelated to both job satisfaction and job stress. However, perceptions of time pressure were related to lower job satisfaction and high stress levels. This finding suggests it may not be the number of hours worked on direct patient care but the sense of pressure created by restrictions on the amount of time allotted to see patients. A recent review of the relationship between visit length and various outcomes sounds a cautionary note to organizations whose policies promote perceptions of time pressure. This review concluded that "visit rates above 3 to 4 per hour may lead to sub-optimal visit content, decreased patient satisfaction, increased patient turnover, or inappropriate prescribing" (Dugdale, Epstein, and Pantilat 1999).

The third aspect of the workplace that is important for physicians is control. This message is clear across three distinct dimensions of control—whether it is over the core of clinical autonomy, over the disposition of resources in the workplace, or over the formal administrative relationships physicians have with colleagues and entities outside their practice setting. Having a sense of control over clinical issues is important in sustaining and enhancing job satisfaction, whereas having control over the resources and decisions in the workplace affects both job satisfaction and stress. The most paradoxical finding is that having control over administrative concerns is

important in reducing stress but also seems to create dissatisfaction. This finding might be explained by examining the reorientation in role that comes with exerting more control over administrative matters. Undertaking such a role reduces the perceived uncertainty in the environment restoring a certain predictability and reducing stress. However, this unfamiliar role can be uncomfortable for the clinician, thus potentially reducing satisfaction. Thus, it seems exerting administrative control has both benefits and costs.

The last aspect of the medical workplace that will be considered is the cultural aspects of the organization that may promote physicians' work satisfaction and reduce stress. We found two different cultural emphases had fairly different effects on satisfaction. Specifically, an organizational emphasis on productivity seems to reduce the satisfaction of its physicians, whereas an organizational emphasis on quality of care seems to enhance satisfaction. Similarly, when there is a cultural and professional ethic that supports balancing of work and family responsibilities, physicians report being more satisfied and less stressed.

Negative Findings

Now that we have explored the significant findings in testing our model, commentary on some aspects of the model that were not supported empirically is in order. First, neither of the two patient characteristics had an impact on either job satisfaction or stress. This may be because the system in which the physicians are working adjusts the rewards and costs of working with such patients in a way that these characteristics are accounted for in compensation or time factors or ancillary support. It may also be that we have not effectively measured these measures. Second, two well-established factors in the literature—age and income—are not affecting either job satisfaction or stress. Most studies linking income and job satisfaction cover a broader range of occupational titles and categories and find a positive association; we have limited our discussion to primary care physicians, so there is a constrained range of variability in income. Second, the lack of correlation between age and job satisfaction may be arising because of a peculiar cohort and expectation effect. There may be greater dissatisfaction among older physicians who see declining prospects for themselves compared to their own expectations. On the other hand, among younger primary care physicians, many are coming to see themselves as having better prospects than they thought a few years ago and certainly better than their more pessimistic predecessors projected for them.

Limitations

This study has two limitations. The first limitation has to do with the measurement of study variables. All measures are self-reports, and some variables were measured using single items. Although the construct validity of each measure cannot be assured, the involvement of a group of practicing physicians goes far to ensuring face and content validity of study measures. Furthermore, construct validity evidence is presented for the job satisfaction and perceived stress measures.

The other limitation is a common lament—the use of cross-sectional data. Although cross-sectional data have a role in research, without the use of longitudinal studies, we cannot hope to understand and model the causal relationships that occur over time. This is particularly true as job satisfaction and job stress are both part of a complex cognitive appraisal process that yields different reactions (psychological, behaviors, physiological) at different points in time. To explore this rich tapestry of relationships adequately, longitudinal research is needed.

CONCLUSION

The image of the physician as the lone professional is not merely historically obsolete, but at the beginning of the 21st century, it may be actually misleading. The age of the organizational physician may be on us, not only because more physicians work in organizational settings, but because the institutional environment in which these organizations themselves function has also changed. Physicians in self-employed, solo practice have declined from 23.4 percent of all physicians in 1980 to 17.5 percent in 1996 (Randolph 1997). Concomitant with the move of physicians into group practices is the association of many of solo and group practices with independent practice associations and physician–hospital organizations or their purchase by physician practice management companies (Robinson 1999). The evolution of many of these organizations has included the development of sophisticated administrative infrastructure that has internalized such health plan functions as utilization management or physician credentialing (Kerr, Mittman, Hays, et al. 2000), which enables them to ally with other health care organizations to solicit direct contracts with employers or accept global capitation from health care plan (Robinson 1999). Given the turbulence of the environment in

which medical practice organizations are now operating, it is not surprising to find, as we have in this study, that stresses reverberate through the organizational matrix to affect the way in which physicians think about and perform their everyday clinical work.

As these organizations and the roles of clinical and managerial professions in them continue to evolve, the challenge for health services researchers is clear—to document and frame these changes so that physicians, managers, and policy makers create a better and "healthier" health care system.

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